YEARBOOK of the ASSOCIATION of PACIFIC COAST GEOGRAPHERS

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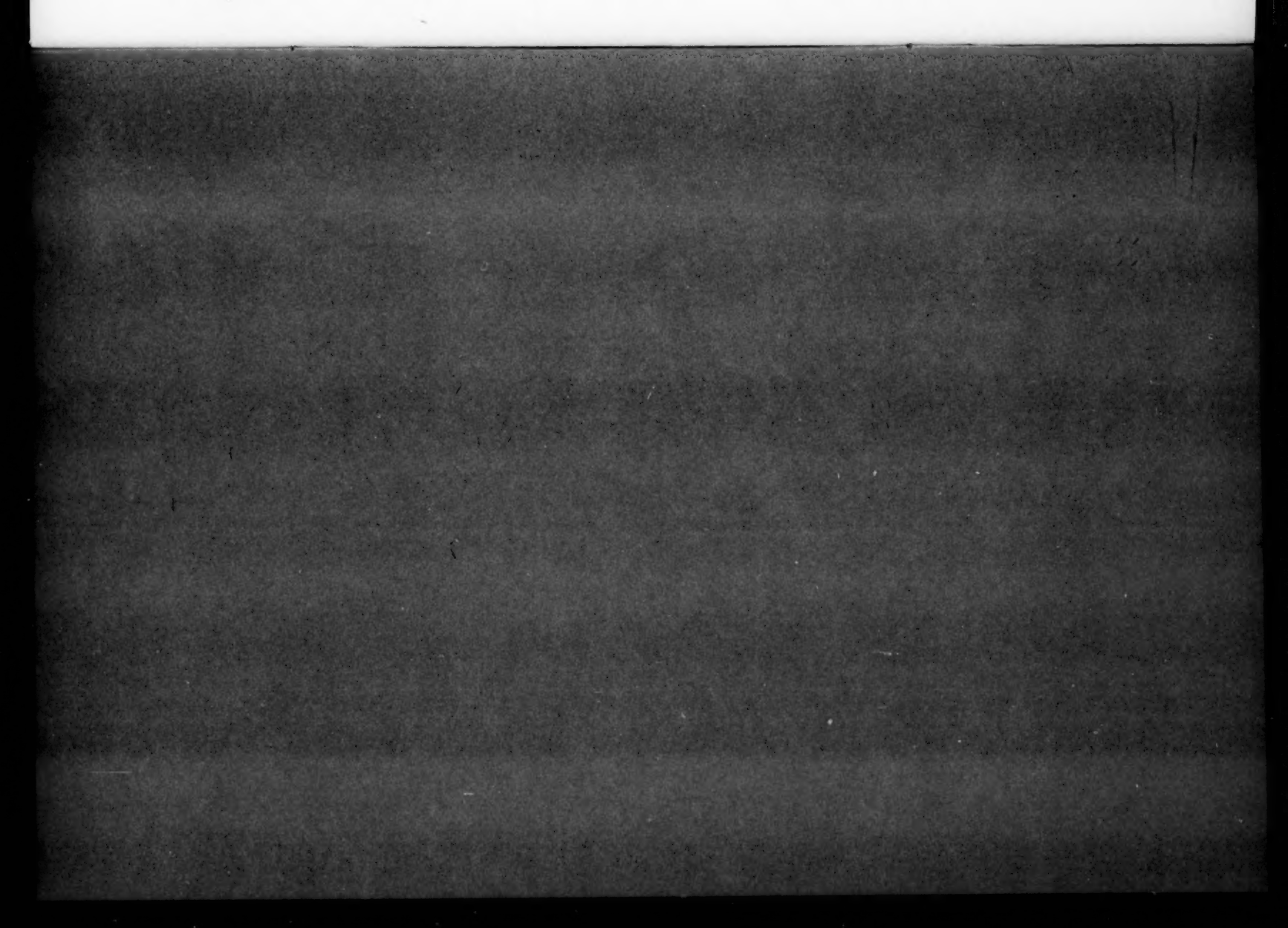

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YEARBOOK OF THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS

Volume 8 1942

VEGETATION OF NORTHERN MEXICO*

FORREST SHREVE
Desert Laboratory, Carnegie Institution, Tucson, Arizona

THE TOPOGRAPHY of Mexico north of the Tropic of Cancer is simple in its general pattern but complicated in many of its details. The Eastern and Western Sierra Madre Mountains, which lie parallel to the coasts, rise to maximum elevations of about 3000 m. and dominate the topography, determine the drainage, influence the climate and fundamentally affect the distribution of the vegetation. Narrow piedmont and coastal plain areas skirt the coasts of the Gulf of California and the Gulf of Mexico. The broad central plateau rises irregularly from the Rio Grande to elevations of 1700 to 2300 m., its drainage being either into the Rio Grande or into enclosed basins. The peninsula of Baja California has an irregular mountain axis and only small areas of coastal plain.

The climate of northern Mexico is mild in its temperatures and arid or semi-arid. The lightly forested areas are visited only by seasonal rains and are semi-arid in many of their biological features. Only in the highest mountains and in favored localities on the coasts are mesic conditions found. The prevailing vegetation is desert, with fringes of grassland or chaparral.

The most arid parts of northern Mexico are central Baja California, the plains on the northwestern mainland, the floor of the central plateau, and the extreme northern part of the eastern coastal plain. In the first three of these areas there is a broad similarity in the vegetation, dominated by a few species of shrubs and numerous cacti, yuccas, agaves and other specialized plants. In spite of similarity in the physiognomy of the vegetation there are strong differences in the composition of the flora which forms it. In the extreme northeast the conditions are somewhat less arid and both vegetation and flora differ widely from those of the other areas.

The principal grassland areas are on the benches which lie immediately east of the Western Sierra Madre and those which surround the northernmost part of the Eastern Sierra Madre. In their composition and structure the grasslands are closely related to those of the southwestern United States.

On the edges of the plateau, and in or above the grassland, are ex-

*Abstract of Presidential address before the Association of Pacific Coast Geographers, at Salt Lake City, Utah, June 18, 1942.

(Note: The author will be glad to send reprints of several short papers on Mexican vegetation to anyone who wishes them. Address: Box 471, Tucson, Arizona).

tensive areas of evergreen oak woodland, with local admixture of juniper and pinyon. At the same elevation, between 1500 and 2200 m., grassland occurs on deep soil and woodland on hills and rocky soil, the climatic requirements of the two types of vegetation being very similar.

Pine forest clothes the western Sierra Madre above 2200 m. almost continuously from the International Boundary to the Tropic. In addition to western yellow pine there are several other abundant pines, as well as a few evergreen oaks and deciduous trees. There are small areas of fir forest on the highest peaks. On the Eastern Sierra Madre the area of pine forest is smaller and more interrupted in distribution than it is in the west.

On the west coast there is a rapid transition in southern Sonora from desert to thorn forest, which is characterized by a thin stand of small leguminous and other trees, with many columnar cacti of species not found in the desert. The well watered canyons on the western slopes of the Western Sierra Madre and on the eastern slopes of the Eastern Sierra Madre are heavily wooded with deciduous trees together with some evergreen oaks and a few pines. The affinities of the floras of the canyons are distinctly sub-tropical, especially in the southernmost canyons of the east coast.

In its larger features the distribution of the several types of vegetation in northern Mexico appears to be controlled by climatic conditions in a manner similar to that which has been demonstrated for the western United States. Detailed study of smaller areas reveals, however, many inconsistencies in the general distributional plan. These cases appear to be due fundamentally to the complexity of the topography and the many local departures from the normal climatic conditions of a given altitude. Differences due to substratum are also important, particularly with respect to limestone and gypsum soils.

Desert is restricted to the regions with less than 300 to 400 mm. of rainfall. The lowest and most uncertain rainfall is in central Baja California. Mulege, with a mean annual rainfall of 104.8 mm., had only 7 rainy months in the years 1924, 1925 and 1926, with a total yield of 3.3 mm. The highest rainfall in the desert is in the limestone areas of the plateau, where it reaches an average as great as 500 mm. at Doctor Arroyo, close in the lee of the Eastern Sierra Madre. Elsewhere on the plateau at the same elevation, with similar rainfall, and on soils other than limestone, the vegetation is grassland.

The importance of precipitation as a differentiating condition in desert vegetation is due not only to its varying amounts but also to marked differences in its seasonal distribution. On the Pacific coast of Baja California it is entirely in the late winter, around the Gulf of California it occurs both in winter and summer, while on the plateau it is mainly in the summer, with only light rain in the winter resting season. The biseasonal rainfall of the northwestern mainland changes rapidly toward the south,

giving Sinaloa a generous summer rainfall and a very dry winter and spring. The mean annual rainfall at Culiacan is 603 mm. and at Mazatlan 852 mm The rains of July, August and September are 73% of the annual total at Culiacan and 79% at Mazatlan. This is the characteristic climate of the thorn forest. On the northeast coast the rains are light but well distributed throughout the year. The climate of the grassland and evergreen oak woodland is one in which summer rains prevail, usually starting in June or July. Both winter and summer storms visit the highest mountain ridges. In the canyons facing the Gulf of California and the Gulf of Mexico the summer rains are copious.

A Letter from the President of the Association

June 9, 1943

To the Members:

With real regret and some misgivings, the Executive Committee cancelled the Annual Session scheduled to be held at Corvallis in June, 1943. From the very outset, there was serious doubt whether the A.A.A.S. session would be held and for several reasons, perhaps chiefly the fear of stringent travel regulations by the Office of Defense Transportation. An increasingly important question for us was the great need of the armed services for geographers. Every indication pointed to a small attendance. In March, our Secretary-Treasurer, Professor J. W. Hoover, left for Washington, D. C., so that he became unavailable for organizing a prospective session.

Accordingly, on March 26, the following notice was sent to each association member from which I quote as follows:

> "Owing to war conditions, your Executive Committee has decided to cancel the annual meeting, provisionally scheduled to be held at Corvallis this June. The heavy demands of the Government for trained geographers, at Washington and elsewhere, make it decidedly unlikely that the attendance would warrant our participation this year at the Pacific Division, A.A.A.S. The officers will carry over and arrange for the postponed meeting at the earliest feasible date. We trust that our decision meets with your approval."

The judgment of your Executive Committee was entirely vindicated by the following notice sent out during May by Dr. J. Murray Luck, secretary of the Pacific Division, A. A. A. S.:

> "Confronted by a crisis in housing accommodations, lecture room facilities, and inability to complete arrangements for the Corvallis meeting, the Local Committee at Oregon State College has requested of the Executive Committee, Pacific Division, A.A.A.S., that the meeting scheduled for the period June 14-19 be cancelled. This recommendation has been acted upon and the meeting is canceled herewith.
>
> "Transfer of the meeting to another institution received consideration but has not proved feasible of attainment at this late date . . . ."

At this time. no plans have been made for future meetings of either the A.A.A.S. or our own group. It is highly important, nevertheless, that the A.P.C.G. be kept alive, and that present members make every effort to enlist the interest of other well-qualified geographers. You will be notified of any significant activities or developments.

Cordially yours,

Eliot G. Mears, President.

IRRIGATION AND PERMANENT AGRICULTURE

D. W. Thorne and D. A. Anderson*

Most early civilizations were based on irrigation agriculture. Eventually many of these civilizations fell. It is interesting to analyze the causes of decline of these cultures to see if any of the factors involved are pertinent in today's effort to maintain a permanent agriculture in the irrigated sections of the United States.

Failures of Civilizations Founded on Irrigation

MESOPOTAMIA

One of the earliest great civilizations was built in the valley of the Euphrates and Tigris rivers in Asia Minor. Today, Baghdad, in the heart of these once productive plains, is located in a barren and desolate waste. In the valley are the remains of two of the largest irrigation canals of ancient times. (Olin, 1913; Kinney, 1912). One of them, the Nahrwan Canal, was 250 miles long; it had an average depth of 30 to 50 feet, and it averaged 400 feet in width. Engineers estimate that this canal carried a volume of water equal to 10 times that of the river Thames in England.

There is no general agreement on the causes of irrigation abandonment in Mesopotamia. Huntington (1924) favors a theory of increasing aridity. According to his studies, rainfall is considerably less in this area in modern times than in the days of Babylon. He believes present water resources could not possibly supply all the 2,000,000 acres under irrigation in ancient times. Huntington's theory of increasing aridity is opposed by Willcocks (1911) and Russell (1941). Willcocks concludes from a study of canal levels that the whole valley between the Tigris and Euphrates was never under irrigation at one time, and that the present water supply is sufficient to irrigate as much land as was ever irrigated at once.

The maintenance of an extensive irrigation system requires a sympathetic and cooperative central government. It seems, therefore, that the destruction of government was more important than any other factor in breaking down the irrigation systems of Mesopotamia. The country was overrun by one warlike nation after another. In 1258 the invasion of the Mongols destroyed all the ancient irrigation systems and left Mesopotamia a desert.

Two observations of Sir William Willcocks (1911) illustrate, however, some of the problems faced by these people. Around the site of ancient Babylon and south of it there are accumulations of soluble salts in the

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soil reaching amounts as high as five per cent. In all areas the banks of canals are built high with silt, showing that much labor was required to keep the canals clear. It is also reported that land in this area gradually passed into the hands of wealthy land-holding nobles who lived in the larger cities. Slave labor was brought in to run the farms. No one maintained an interest in careful farming. Water was used improperly and finally the soil became waterlogged. Without proper drainage, soluble salts came to the surface and much of the area was abandoned.

CARTHAGE

Carthage and the surrounding agricultural territory in North Africa reveal much the same story (Smith, 1902). After the third Punic War and the destruction of Carthage, the Romans founded an extensive irrigated agriculture where now are found sand dunes of the Sahara desert. The extensive canal systems were operated largely by slave labor. As the Roman Empire crumbled, labor could not be regimented to maintain the canals and the African project was gradually abandoned. Similarly, in Palestine and ancient America (Prescott, 1843, 1847) political upheavals seem of far greater importance than soil deterioration in the breakdown of irrigation agriculture.

EGYPT

Extensive irrigation has been practiced in the Nile valley in Egypt for more than 4000 years. (Peel, 1904; Willcocks, 1897). The longevity of irrigation agriculture there is often attributed to the manuring value of silt deposited on the land each year by Nile floods. The layer of silt deposited each year, however, averages only 1/25 of an inch in thickness or about three tons of soil per acre. While this addition has certainly helped maintain fertility over long periods of time, to attribute the entire success of agriculture in Egypt to such small annual additions of soil would be to ignore the many factors which make for successful farming. As an indication of other problems involved Schwinfurth (1899) says, "Egyptian agriculture . . is nothing but a continued fight against salt." And Peel (1904) reports, "Salt is the great enemy to be fought."

CHINA

China is a rival of Egypt in antiquity of irrigation. (King). Since 2627 B. C. the Chinese are known to have practiced irrigation. In the seventh century the Grand or Imperial Canal was built across a plain for a distance of 700 miles, and used both for navigation and irrigation. Much of the land of China has been irrigated as long as 4000 years and still gives good yields.

In summary, it may be said that since it took strong governments to create and maintain extensive irrigation systems, with the breakdown of these governments came the disintegration of agriculture. One man or one small

group could not maintain extensive canals essential for water delivery. Accordingly, irrigation agriculture is peculiarly susceptible to political upheavals. Along with this susceptibility to social upheavals were the hazards of climate, and of waterlogging, alkali, and erosion. Yet despite these handicaps, in Egypt and China irrigation has survived as long or longer than any other system of intensive agriculture.

BENEFITS FROM IRRIGATION

In comparison, the irrigated West of the United States could, of course, become subject to social and political disintegration in event of enemy invasion destroying large irrigation dams. Such a possibility is at present remote. More serious threats are those of waterlogging soils, alkali, and soil erosion, and the economic hazards of competition with other sections of the United States.

MOISTURE CONTROL

In general, the only physical advantage that can be claimed for irrigation agriculture over non-irrigated agriculture is moisture control in the soil. Under a good water right a farmer is able to supply crops with water at any time or in any quantity considered desirable. The relative advantage of this control over soil moisture depends to a considerable degree on local climate, the crop under cultivation, and the cost of the water.

NUTRIENT ADDITIONS

Other advantages are also frequently claimed for irrigation. One such claim is that irrigation water carries with it large quantities of plant nutrients which fertilize the soil. To a limited extent this statement is true. A yearly application of two acre feet of irrigation water from such pure mountain streams as Logan, Weber, and Provo rivers will add nearly 1000 pounds of calcium and magnesium carbonate to soil. On some soils such additions may be important in maintaining a balanced soil condition. On other soils already well supplied with lime such additions are unnecessary.

According to a report by Greaves and Hirst (1918) two acre feet of irrigation water would add an average of 22.8 pounds of nitrogen, 3.36 pounds of phosphorus, and 33.4 pounds of potassium. Thus, as far as the three major fertilizer elements are concerned, there are appreciable additions of potash and nitrogen to many soils by irrigation water, but only slight additions of phosphorus.

HAZARDS OF IRRIGATION

LEACHING

A measure of nutrient losses by leaching is needed to indicate the significance of the quantities brought on to land in irrigation water. It is doubtful whether, under average well-drained farm conditions, the mineral nutri-

ents added by water much more than balance the losses by leaching. Botkin and Shires (1939) have shown that in New Mexico irrigation is gradually leaching lime from the soils in spite of any initial lime content of the irrigation water employed.

SILT DEPOSITION

For most areas no figures are available for the silt content of irrigation waters. This content is probably highly variable, depending on the nature of the stream and the season. Silt may have a definite value on very sandy soils, as shown in Egypt (Willcocks, 1899) and in the Salt River Valley of Arizona (Powers, 1939; McGeorge, 1941). In the latter project nearly a foot of silt has been deposited by irrigation water over a very permeable, infertile sand, thus making profitable farming possible. In other areas silt deposition has been harmful in that infertile silt has been deposited over fertile soils.

WATERLOGGING AND SALT ACCUMULATION

While additions of materials in irrigation water are sometimes beneficial, in many instances they may be harmful. Harmful effects are usually in the form of waterlogging of soil and accumulations of undesirable salts. The extent of such damage is illustrated in unpublished soil survey reports for two areas in Utah. If only deep alluvial soils are considered, 12,300 acres in Uinta Basin and about 9,000 acres in Salt Lake County have become at least partially waterlogged as a result of irrigation. This represents about 7.5 per cent of the deep alluvial soils in the two areas. While much of this land is still being farmed, such deep-rooted crops as alfalfa usually fail. Many of these soils could be readily reclaimed by drainage, but some are saturated with soluble salts and are so poorly adapted to drainage that it is doubtful whether reclamation would be practicable.

Soil survey data also indicate the extent of soluble salts in Utah soils (Jennings, Gardner, and Israelsen, 1934). In 1920, of a total of 1,416,957 acres of land surveyed in the arable sections of Utah, 617,459 acres or 43.58 per cent contained 0.2 per cent or more of soluble salts. This quantity is sufficient to limit the production of many crops. It is not possible to say just how much of the salt in these soils has been brought in by irrigation water. In many areas, however, increasing salinity is being encountered in lower land as a result of irrigation on higher land.

SOIL EROSION

Some writers have claimed that one of the chief advantages of irrigation agriculture is the absence of erosion. Such statements must arise from a lack of intimate acquaintance with irrigation projects. The extent of erosion in irrigation is apparent by a drive through the agricultural lands of Utah. At the side of every highway, soil accumulation can be seen at the

bottom of fields raising the land level one, two, or even four feet above the fields below. This change has been so gradual that farmers are hardly aware of it. Many farmers have remarked, however, that crop yields are much better at the lower ends of their fields.

A brief study has been made by Anderson, Martin, and Thorne (1942) to determine the changes in soil constituents as a result of this soil movement down the slopes. In each field three composite soil samples were taken near the lower end where the soil has accumulated and three other composite samples were taken further up in the field where there had been some soil removal by erosion. In each case the upper and lower samples were taken as near as possible to each other to avoid wide soil differences under initial virgin conditions.

On an average, the data obtained showed that the lower ends of fields contained 20 per cent more nitrogen and 30 per cent more organic matter than the upper ends. There was no significant difference in available phosphorus, but this may have been corrected by recent additions of fertilizers. That the differences noted resulted from changes since irrigation began was shown by sampling in adjacent fence rows which had not been cropped or irrigated. Analysis of samples from these fence rows showed no significant difference in composition of the samples obtained at the upper and lower ends of the fields.

COSTS OF PRODUCTION AND MARKETING

Besides physical problems of waterlogging, salt accumulation, and erosion, irrigation farmers also face an economic problem. To a great extent they are located far from large industrial areas and centers of population. Consequently high freight costs must be subtracted from the market price of their products. In addition, it generally costs more to produce crops on irrigated farms than on non-irrigated farms. Increased costs result from at least two causes: (1) cost of irrigation water, and (2) increased labor in making ditches, preparing land for irrigation and caring for the irrigation water. Irrigation water varies in cost from almost no cash expenditure to $25 or more per acre per year. In a study of 6,000 irrigated farms in several western states, Ewing (1926) found that the annual water charge amounted to about 1/20 of the total actual expenditure for farm purposes.

Although many authorities claim that irrigation farming is relatively more productive than humid farming, such a conclusion is not substantiated by the figures reported for barley, oats, corn, and potatoes in the humid North Central and North Atlantic states compared with similar data for the irrigated western states as reported for the years 1923-1932 in U. S. Department of Agriculture Statistics for 1938. When this lack of superiority in crop yields is associated with increased production costs and a generally unfavorable location with respect to markets, it is difficult to see how western

arid agriculture can compete in the production of general farm crops produced extensively in other parts of the country. Consequently, irrigation farmers produce relatively little of the competitive crops like wheat, cotton, and corn. Most land is used to supplement range feed for livestock, and in other irrigated areas specialized crops such as sugar beets, fruits, and vegetables are produced.

The principal problems facing irrigation agriculture, then, are water storage, conveyance, waterlogging, accumulation of excessive amounts of soluble salts in soil, erosion, possibly some excessive leaching, high costs of production, unfavorable location with respect to large markets, and perhaps no greater average yields of many common crops than are produced in the humid East.

Expansion of Irrigation Agriculture in Western United States

The picture just presented is probably unjustifiably pessimistic. Many factors operate in favor of the arid West which may help offset some of the problems enumerated. Newer knowledge of irrigation, drainage, and soil conservation is not only overcoming many past mistakes, but is aiding in the restitution of profitable farming in areas damaged by careless farming methods.

Any attempt to intensify irrigation agriculture, or to examine the prospects for future expansion must consider several problems. In most areas land is more available than water. Frequently the available water is not being used on the best land. And on most lands inefficient irrigation practice is more the rule than the exception.

Almost all water readily available for irrigation in the arid West is now being utilized. Hence, any important expansion of irrigated acreage from either the storage of winter and spring runoff and from conveying water long distances must come through government-supported projects. In most cases large dams and canal systems to store water and place it on additional first class land are too expensive to be paid for by the sale of water. When storage costs are largely supported by the production and sale of electric power such projects become feasible. Yet, in many instances, electric power and irrigation do not work well together. Irrigation water is stored during the winter and spring for irrigation in the summer. A continuous discharge is needed for electric power production where it is used for home consumption or industries operating continuously. On some projects in important irrigated areas the relative value of water for irrigation and power is becoming a significant problem.

Benefits from Better Irrigation Practices

Probably one of the most important steps in the future of irrigation is education in better irrigation practices. Israelsen (1939) has found through

a study of irrigation in Utah that the average water application efficiency is only about 40 per cent—where irrigation efficiency is defined as the amount of water stored in the soil divided by the amount delivered to the farm. This means that nearly two-thirds of the irrigation water delivered to Utah farms is being lost as runoff or it is percolating through the soil to depths below any benefit to plant growth. This low efficiency of irrigation is no doubt the key to many of our irrigation problems. Runoff water is causing erosion. Water draining through soils rises in the lower land causing water-logging and frequently carrying excessive quantities of soluble salts into the soils.

In addition to water losses on farms, large amounts are being lost by seepage from canals. In one 4,000-foot section of a canal in the Delta area of Utah the loss by seepage averages six second-feet or twelve acre-feet per day. (Israelsen, 1941). This represents a loss of crop production on an area of 500 to 600 acres. It is estimated that 25 per cent of the water in Uinta Basin is lost by seepage from canals before reaching farms. (Blanch and Stewart, 1942).

If irrigation efficiency throughout the west could be raised to 60 per cent, and if seepage losses from canals could be controlled by proper cleaning and lining, water could be released to increase production greatly on land now having inadequate water rights and in some areas much additional land could be brought under irrigation. The institution of more efficient irrigation practices and the control of seepage appear as the most logical hopes for the future development of irrigation. Undoubtedly, much will be done in this field but progress through education is necessarily slow and fraught with many reverses.

DEVELOPMENT OF NEW IRRIGATION PROJECTS

Upon completion of the Columbia Basin project in central Washington, about 1,200,000 acres of land now supporting a negligible population will be brought under irrigation (Debler, 1940). The average farm is estimated at 50 acres, the farm population at five persons per farm, and town population at two persons to one on the farm. Thus, in one project a population of 360,000 is expected to be supported in a now practically uninhabited region. A study by the Bureau of Reclamation (Debler, 1940) estimates that in the Great Plains area 4,500,000 acres can be brought under irrigation giving support to 696,000 additional people. In the Intermountain area an additional possible 6,400,000 acres will support 2,100,000 more people. In the West Coast region 11,100,000 acres more can be irrigated which will tend to increase the population by 3,580,000. In total, according to Debler, projects are contemplated to irrigate 22,000,000 additional acres with an estimated population increase in these areas of 6,376,000.

The above figures are based on proposed reclamation projects. The extent to which these goals are realized will depend largely on the attitude of the government toward the reclamation program.

Any extensive increase in population in the arid West is to be expected from industry rather than directly from agricultural employment. Goodrich and Davis (1936) have shown the role of irrigation in this type of development in a study of Yakima County, Washington, on irrigation projects costing approximately $33,000,000.

> **As a result of these projects and their subsequent industrial development, the population of Yakima County increased from 13,462 in 1900 to 77,402 in 1930. During this same time the population of Yakima City increased from 3,154 to 22,101. The assessed valuation of the county has increased from $25,004,000 in 1900 to $233,041,000 in 1930, or almost tenfold . . . Obviously, these benefits have been realized through agriculture, as a population base, being followed by factories for the processing of farm products.**

The future of agriculture under irrigation in the United States is secure because life in the arid West depends on it. There are many problems to be solved just as there are problems facing agriculture in humid areas. The amount of land permanently injured by irrigation is probably proportionately less than that destroyed by erosion on non-irrigated agricultural farm land. Abuses of irrigation seem neither more common nor more irredeemable than mistakes that have been made and are occurring in the important humid climate farming sections of this country. Therefore, there appears no more reason for questioning the permanency of irrigation agriculture than for questioning the permanency of any other form of agriculture in the United States today.

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MODIFICATION OF THE EARLY UTAH FARM VILLAGE

Jos. A. Geddes

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Virtually all of the early villages of Utah were farm villages. The first form of settlement was the fort village, in which the houses were built along the inside walls of the fort. Men took their guns with them to work. Guards were on duty at night. Some of the settlements, however, were established without forts. The fort villages did not last long. With the decline in power of the Indians, the typical farm village became the dominant type. These Mormon farm villages had the following characteristics:

1. Wide streets running parallel, north-south and east-west, usually 6 or 8 rods in width.
2. Square blocks containing either 5 or 10 acres. The 5-acre blocks were divided into 4 lots of 1¼ acres each. The 10-acre blocks originally contained 20 lots of ½ acre each and were designed for urban conditions. All the inhabitants, both farmers and non-farmers, lived in the village.
3. One full block near the center of the village was reserved as a public square on which recreation centered.
4. Trees were planted around the public square and on the outside line of the sidewalks where a small ditch of irrigating water ran to supply the shade trees and as a source of water for the gardens, orchard trees and lawns within the lots.
5. On or near the public square were the church and the school, with the store not far away.
6. Extending from the village to the nearest mountain stream was the canal or canals which carried life-giving water to the farms around the compactly settled area.

A rather rigid system of land ownership was set up which aimed at equality among the members of a community. The Mormons were slow to accept the inequalities of capitalism which have now become so strongly entrenched. Equality in land ownership was sought, (1) by making 1¼-acre lots available to each home owner; (2) by dividing the land in 20-acre farms; and (3) a share in the regulated use of the common pasture. Later, when a 20-acre farm was found to be too small for a large family or families it was difficult to purchase an adjoining plot. Hence, a farmer, particularly if he lived in a village, owned farm land scattered in a number of places. Separation of land still plagues the farmers of these communities.

In early days the Mormon bishop was the real leader of the community. Farmer and non-farmer mingled together in a society in which strong social solidarity existed and in which cooperative effort was seasoned and effective. Religion was the pervasive and generative force that penetrated all fields of action. The farmer was dominant in the community. He and his sons traveled to the farm near the periphery of the square blocks, but in the evening and on Sunday he collaborated with the storekeeper, the school teacher, the carpenter, and the mason in matters pertaining to worship and community needs. It was many years before the clearing of the sagebrush, the building of the schoolhouse and church house, the construction of canals

and the strengthening of levees permitted the direction of community effort toward surfaced roads, culinary water, and, much later, toward concrete sidewalks.

In origin the Utah farm village is of course not entirely new. It resembles in some respects the farm village of ancient times. It has certain resemblances to the New England town. But the New England town is irregular in shape rather than nearly square as in the Utah villages, and its streets are not as wide or definitely patterned. The New England town was not subjected to the compelling influences of irrigation. The Utah villages are really modeled after the "plat" of the City of Zion which was worked out in Kirtland, Ohio, by Joseph Smith and others in 1833. (Fig. 1). Utah villages were "little Zions" rather well adapted to Great Basin conditions. Some of them, particularly smaller villages, followed the Nauvoo, Illinois, modification of the Zion plan. In Nauvoo the streets were 6 rods wide instead of 8, and the blocks contained 5 acres instead of 10.

Nearly a century of existence shows a good deal of persistence of original pattern among the Utah villages. In many cases there has been no change. In others there has been some modification or abandonment. Modification of the original village plan has taken four directions: (1) farm dwellings have been built rather extensively along the highways and principal roads running from the village; (2) farm houses have been built outside the original blocked areas on the surrounding farm land. This spread of dwellings beyond the village does not mean that these farm dwellers have superseded or taken the place of village farmers living inside the blocked territory. Both farm dwellers and village farmers are found in comparatively large numbers in such communities. Whether the social and cultural advantages of living in the compactly settled area outweigh the economic disadvantages of living apart from the farm is a moot question. The two patterns continue to exist, each preserving certain advantages and disadvantages. More will be said of these later.

In modification (3), the village form is abandoned altogether. Such a departure is observed in open country communities, where every dwelling is situated on the farm to which it belongs. Community centers in these neighborhoods consist of a church, a consolidated school, and possibly a service station and a store, or both. Modification (4) is a trade center where non-farm, business, professional, and skilled and unskilled workers have become more numerous than farmers and tend to assume leadership in community affairs. These trade centers, many of which are county seats, have come to exercise a strong influence over surrounding smaller communities and neighborhoods. Some of the latter are declining and all are being profoundly influenced by good roads and rapid means of communication.

With all the forms of modification the farm village has experienced, its essential characteristic, the clustering of farm dwellings in a planned

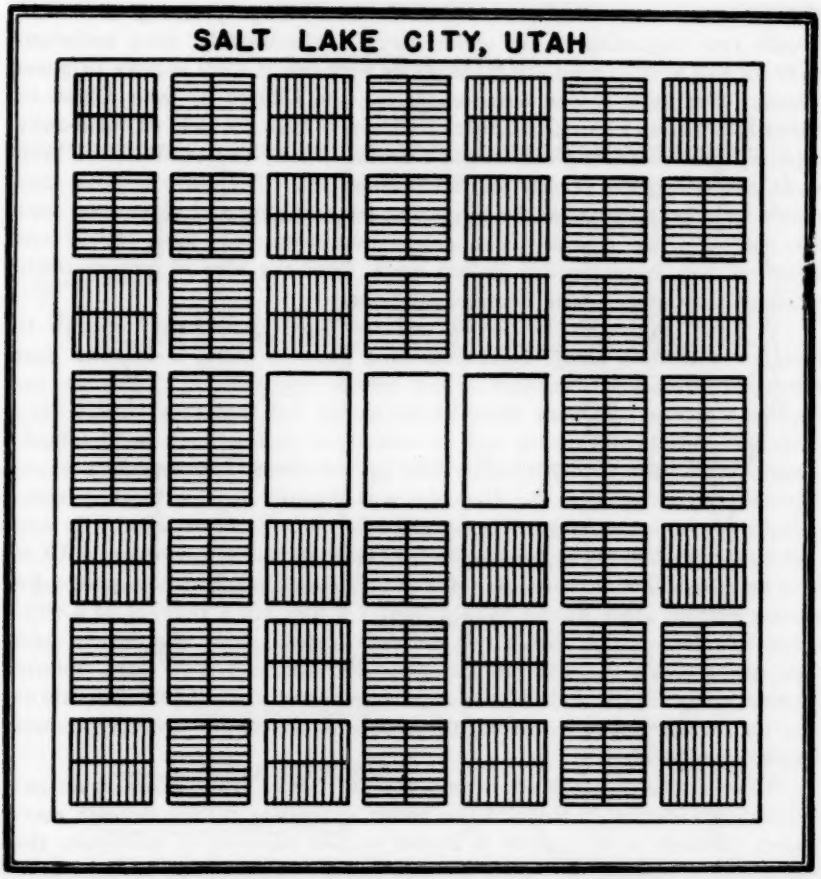

Figure 1. Sketch of the original plan for the City of Zion, from the original drawing in the office of the Church Historian of the Church of Jesus Christ of Latter-day Saints, at Salt Lake City. Area covered, one square mile.

area, persists in Utah to the present time. In Cache County are one small city, two farm villages that have remained true to type, eleven modified farm villages that retain much of the old pattern, and nine open country farm communities.

Community Planning Aspects

Undoubtedly the original Utah farm village pattern was a contribution to good living. It represented a departure in planned economy applicable to city and village. The city planning movement developed momentum in

America much later than Joseph Smith. The village planning movement is only now beginning to get under way. Unfortunately, most unfortunately for this area, community planning as a process did not survive Brigham Young. For some reason never explained, the Church of Jesus Christ of Latter Day Saints (Mormon Church) withdrew from the field of community planning soon after Brigham Young's death. Many conjectures have been made concerning the reason for this withdrawal. The early impetus may simply have been lost after the colonizing era was over and older men came into control of the church. The people themselves may have slowly and more or less imperceptibly drawn away from the idea of progressively creating Zion units under desert conditions.

A desert toughens the bodies and spirits of those hardy enough to survive. Mountain roads, sagebrush, sand burs, breaking levees and dust developed picturesque language, which neither originated in church nor invited to worship. Perhaps these hardy people felt that they should keep alive first, sustain the church and its missionary system next, build schoolhouses, and let the next generation take up community improvements where they left off: or perhaps the Zion plat was thought of as a finished, completed thing which should not be altered after once being installed. In any case new contributions to community organization failed to emerge in Utah for a period of 50 years or more. When activity on behalf of the community became evident again during World War I it was not a renewal of a neglected function of the church. It derived, instead, from the federal and state governments through the Extension Service with 4-H clubs, Future Farmers units, Black and White days, community councils for beautification, etc., which began to remind the people of a powerful stereotype once deeply embedded.

Whether the Church of Jesus Christ of Latter Day Saints again assumes direct interest in the effort to create a superior culture through community channels or is content to permit secular agencies to undertake the responsibility unaided, it is quite obvious that the communities of Utah have sorely missed the powerful influences exerted by Joseph Smith and Brigham Young. The larger concept of creating a superior culture, here alluded to and included in the concept Zion, involves, of course, a continuing program dealing with events, projects and institutions. A great people does not allow its institutions to lag unduly, nor does it permit great gaps to develop between advances in technology and other phases of social activity. It is by processes of adjustment that the social machine is kept in good working order. So much for the idea of process as contrasted with static concepts.

I now raise the question: Which of the two principal modifications of the farm village that has occurred best preserves the conditions for fruitful living? Is it better to build a dwelling on one of the principal roads leading out from a village or to build on the farm anywhere around the square blocked

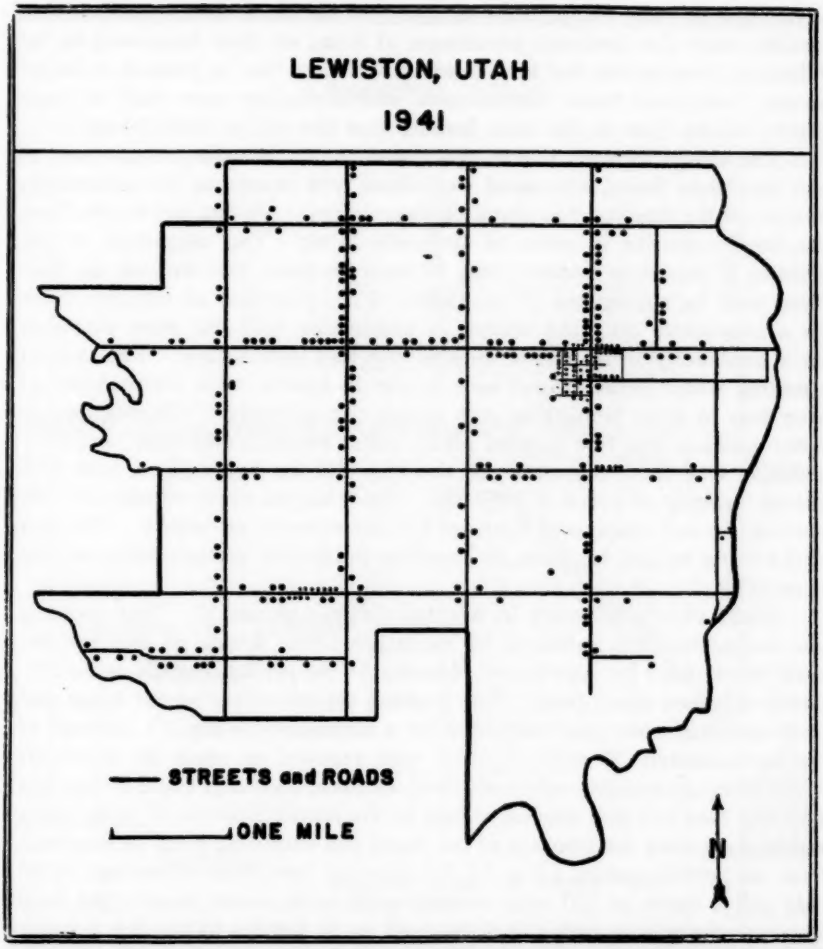

Figure 2. Present location of homes and streets in Lewiston. The small squares are village blocks. The large squares are mile square sections. Each dot is a house. In this community the majority of the people live on their farms facing the roads which border each square mile. The incorporated limits cover an area roughly five miles square.

area? If one or the other of these possibilities is superior can anything be done through community planning to make the superior modification available to larger numbers?

Some Findings

Recent studies seem to show that: Families living on the principal roads for some distance out from the subdivided area of a village have the same

advantages as those living on the periphery of the blocked area itself. These families enjoy the combined advantages of living on their farms and in the village.In communities that have been studied they live, in general, in better houses, have more home conveniences, and participate more fully in community affairs than do the farm families that live out on their farms.

The village farmers, that is, those who live in the village and travel to and from their farms, also stand well ahead with respect to the advantages named, of the families that dwell on their farms. Moving out to the farm has been expensive in terms of favorable living. The magnitude of the problem of providing modern living facilities for those who live out on their farms may be appreciated if one thinks of the provision of culinary water for a community six miles square, in comparison with the same provision for a community living within an area one-half mile square. The cost of installing water mains around each of the 36 square miles for the sake of from four to eight families in each square is prohibitive. What is true of water mains is also true of oiled roads, sewer systems, electricity, and telephones. One Utah community of this type did lay water mains over such a large territory, at a cost of $250,000. But it has no sewer system and few oiled roads, and community agencies are not strongly developed. The cost of the water system has been an excessive burden on the population of this community.

Could such a difficulty be avoided through planning? That question can undoubtedly be answered in the affirmative. Much of the problem could be obviated by appropriate planning of the principal roads and of location of houses along them. The gridiron scheme of laying out farms and roads involves many inconveniences for a community. (Fig. 2) Instead of the approximately 30 miles of water main required to reach the dwellings in the rural community mentioned above, all these dwellings could be reached with less than half that amount of pipe by the proper location of main roads and by narrowing the frontage of the farms and extending them farther back from the country roads. (Fig. 3) An irrigated farm with a frontage of 40 rods and a depth of 320 rods containing 80 acres would mean eight farm houses to the mile on each side of the road, or 16 families to pay for a water main as against eight for the same size of farm under the gridiron plan. Moreover, no water mains would be required on two and in many cases three sides of the square mile if the roads were well located. Fewer roads would have to be paved, so that those paved could be kept in correspondingly better condition.

By such arrangements, all the farm families could live on principal roads and enjoy the advantages of piped water, good roads, sidewalks, sewage disposal, and electricity at reasonable cost. Less accessible land could be left to the village farmers, who already have these conveniences. Under such planning the farm dwellers would live on their farms but these

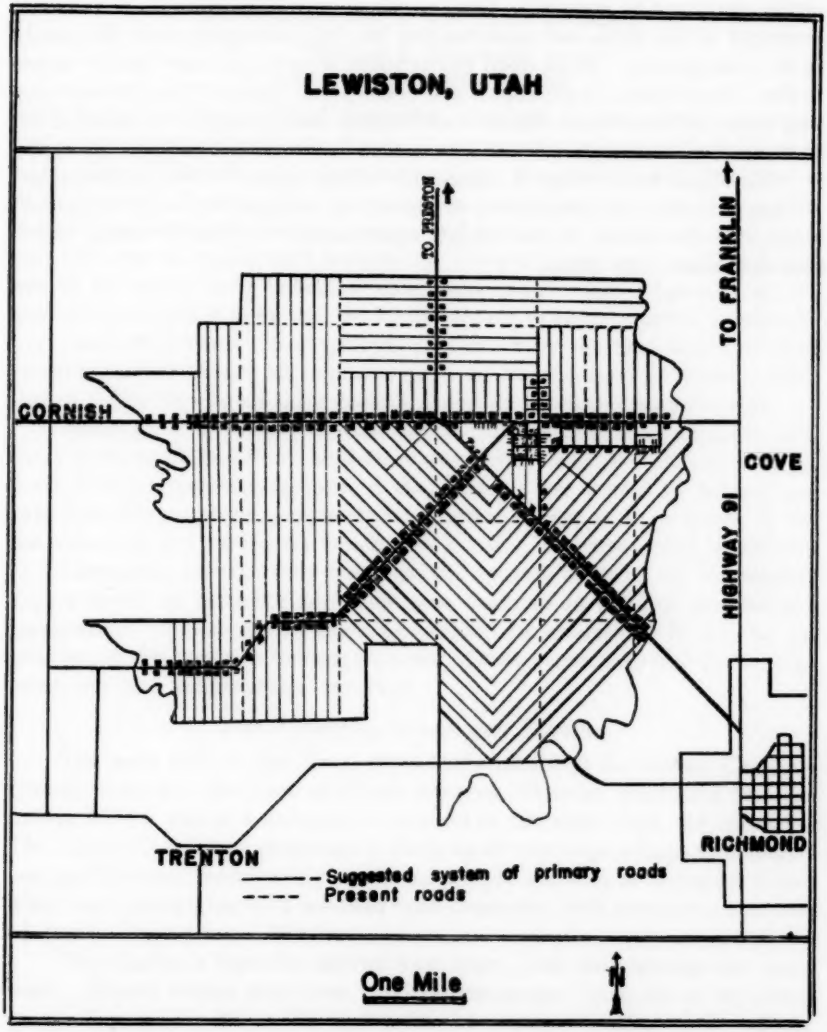

Figure 3. A possible re-arrangement of roads looking to the possession by all farm families of the fuller living enjoyed by edge-of-village families. These roads would be primary roads subject to as much physical improvement and beautification as the growing cultural needs of the people living along them would require: oiled roads, sidewalks, sewerage lines, conduits for electric power and telephones, with shade trees and here and there a small park where roads turn. The roads to Preston, Cornish and the outer portion of the road to Trenton are superimposed on present roads.

farms would not be isolated. They would enjoy the advantages of personal oversight of the farm and opportunities for full participation of the family in its management. With good paved roads they would have better access to the village doctor or merchant, and could afford more of the conveniences that raise the lot of farm women and children from drudgery to enlightened and pleasurable living.

The Utah farm village is susceptible to and invites further modification. Village planning, like community organization, is a process, not a completed thing. In the future lie the larger contributions to fruitful living which planning alone can bring.

SOME ENVIRONMENTAL INFLUENCES IN THE CULTURAL DEVELOPMENT OF THE HAIDA

WILLIS B. MERRIAM
University of Oregon, Eugene

THE PACIFIC Coast of British Columbia gave rise to one of the distinctive native culture centers of North America, and in many ways the Haida Indians of the Queen Charlotte Islands represented the foremost cultural development of the region. A comparison of the conventional designs of the Haida, their shapely and seaworthy dugout canoes, and their horn, slate, and wood carving, with that of similar work done by the Tlingits to the north and the Nootkas to the south, ably indicates what these people had achieved. In the non-material culture field, too, the Haida appear to have achieved superiority over other Northwest Coast groups, as evinced by the complexity of their social organization with an emphasis upon wealth as a mark of social distinction, a highly developed slave economy, and an extensive coastal trade.

Although it is recognized that native cultures cannot be explained entirely in terms of, or held to be derived completely from, the natural environment, it is nevertheless recognized that cultures are rooted in nature, and that they can never be completely understood except with reference to the natural stage and setting on which they occur. The story back of the rise and subsequent decline of the Haida people appears to lie to an outstanding degree in the adjustments that they have made to an unusual and fleeting combination of elements in their geographic environment. It will be the problem of this study to investigate some of those environmental factors and point out the relationships involved.

THE PHYSICAL STAGE AND SETTING

The main body of the Haida historically inhabited the Queen Charlotte Islands, lying off the coast of North America, 75 miles northwest of Vancouver Island, and at a distance of from 60 to 100 miles from the mainland. The Queen Charlotte archipelago is made up of two large islands and numerous smaller ones, representing partly-submerged summits of the coast range. The shore is rough and of a subdued fiord character, with occasional stretches of gently sloping sand beaches.

The climate is typically marine west coast, with mild winters and summers. Heavy winter maximum precipitation ranges from 40 to 60 inches on the leeward, to 80 or 100 inches on the windward sides of the islands. Mild temperature and abundant rainfall have combined to clothe the slopes in dense forests of Douglas fir, hemlock, spruce, and cedar trees which often attain large size. The faunal wealth of the region at the time of the peak of Haida cultural development lay in the marine life, particularly the sea-otter. Among the fishery resources, salmon, halibut, and *oolichan* (the oil-yielding candle-fish) were to be had in unlimited numbers.

THE ECONOMIC BASIS OF HAIDA CULTURE

In common with much of the Northwest coast, the Queen Charlotte Islands proved inhospitable toward agriculture. Climate, soil, and topography were unfavorable. Ordinarily, without agriculture a sedentary and settled culture is not likely to develop. However, the Haida built large and permanent villages, engaged actively in commerce, kept slaves, and evolved a highly complex system of government and social control. This development was possible because the sea provided the main necessities for civilization, an easily obtained, abundant, and permanent supply of food, insular protection, the sea-otter which proved a basis for trade, and optimum conditions for easy and cheap transportation.

A source of wealth such as that afforded by the sea-otter pelts enabled the Haida to trade for tools, boxes, baskets, and other articles, in time, including slaves. Active commerce up and down the coast from Prince William Sound to Puget Sound placed the Haida in contact with a wide range of cultures and resources.

From trading it was only a step to plundering. For this the Haida had optimum conditions. Protected by a broad expanse of salt water, their families were relatively safe while the men were away. With war canoes, capable of carrying from 60 to 100 men, it was easy to attack a mainland village, gather plunder and prisoners, and make an escape. The first slaves were prisoners; later, an active slave trade arose, and many tribes as far south as Oregon included slaves in their stocks of trade.

THE INFLUENCE OF THE HAIDA SLAVE ECONOMY

Undoubtedly one of the most important developments that affected the culture pattern of the Haida was the rise of the institution of slavery. A number of factors favored a slave economy: abundant food, sufficient work in its preparation and processing to encourage a definite division of labor, and an isolated island location that made escape improbable.

Once a slave population was introduced, slaves tended to do much of the cruder work, leaving the freemen added time to devote to trade and industry. Many of the slaves were highly skilled artisans; it was not until the slave economy was well under way that carved wood, shell, bone, and horn utensils were added to the export lists of the Haida. It was also with this specialization and division of labor that more and better canoes were made by expert canoe builders, and these, too, became important articles of commerce.

Another influence of the slave economy may be found in the social ideals and social organization of the Haida. Slave labor and trade aided in producing an abundance of both food and wealth. It is highly probable that the practice of giving large feasts and the institution of the Northwest Coast

Indian custom, the potlatch, may have originated in the need to distribute and consume surplus food or equipment before it spoiled.

Also traceable to the slave institution was the recognition of social status depending mainly upon wealth. This development appears to be a response to the need of enforcing a rigid caste system. Many of the slaves were leaders in their own tribes. Many were excellent hunters and fishers or possessed other skills. Under an emphasis upon wealth as a basis for status, a slave might be valued for his abilities, and yet despised because he controlled no personal wealth.

Cultural Maturity and Decline Among the Haida

Haida folk art, executed in earlier times with crude stone adzes and chisels, brought forth skills that flourished on an unusual plane after steel tools were obtained from the white man. Haida art probably reached its greatest development during the first half of the nineteenth century, while the best native skill was still extant, after steel tools had been acquired, and while considerable surplus wealth was yet available.

During this period trade voyages were made from the islands as far as Prince William Sound to the north and as far southward as Neah Bay or the Puget Sound villages, a distance of 1600 miles. This trade organization, which probably should rank as the greatest monument to Haida civilization, has, unfortunately, left few tangible evidences of its extent. As a result, Haida culture is known more for its totemic art and its ceremonialism than for any of its other manifestations.

Before the coming of the white man, their genealogical record poles (or totem poles) were relatively simple affairs. After steel tools were introduced the totem carvers could turn out more and better work. Hence the great output of totem poles represents a rather recent development and a highly localized art. Probably no cultural trait of the Haida declines so rapidly in the hands of other tribes.

Another trait of the Northwest Coast, one that rose to bizarre heights among the Haida during the maturity of their culture and actually hastened their downfall, was the Potlatch ceremony, during which large quantities of food and goods were consumed or given away as a means of raising individual or family social status. Families saved and stored for years in order to repay a Potlatch or raise their social status by giving a bigger Potlatch than they had ever given before. Obviously, a custom such as this could never have developed except among a people who based rank upon wealth and who had sufficient open resources to permit the accumulation of vast fortunes in kind.

With the coming of the white man came the rapid passing of the sea-otter, the resource base of Haida trade, wealth, and social pattern. Potlatches became more frequent when money was introduced, and Hudson Bay

blankets replaced the sea-otter pelt as currency. No means were spared to gain wealth for these ceremonials. With the sea-otter harder and harder to get the Haida hunters gave up hunting; but still imbued with a desire and a social responsibility to repay Potlatch debts, whole villages flocked to Victoria and elsewhere to gain quick wealth by prostituting their women.

Smallpox at the end of the eighteenth century and venereal disease in ths nineteenth century took their toll of the population, which rapidly dwindled from over 8000 in 1800 to less than 1000 a century later. Today there are but two inhabited villages on the Queen Charlotte Islands, and their combined population numbers barely 650. Dr. Diamond Jenness, Director of Indian Affairs for the Dominion of Canada, feels that there will be few survivors at the end of the century.

Their culture, he says, was not virile, but was more like an exotic hothouse plant, nurtured by isolation in a peculiar environment, and incapable of withstanding the chill breeze from the outside world. He compares it to Greece in the days of its decadence, dazzling the more primitive tribes on its borders, with its influences extended farthest after decline had set in at the heart. It had apparently reached a climax with the coming of the white man, and was lacking in further potentialities for healthy and vigorous growth.

The Haida Indians had developed an ornateness in culture that made it impossible for them to readjust their pattern to a changing milieu, a story familiar to the student of evolution and cultural development.

With the virtual extinction of the sea-otter, the Haida attempted agriculture with indifferent success. They introduced potatoes on the better drained lowlands, and for a time had an export surplus. With the coming of the commercial cannery, it became difficult even to obtain a subsistence supply of salmon. Today the remnants of this once numerous and outstanding people represent a somewhat miserable group who catch a few fish, plant a few potatoes, work part time in the salmon canneries, carve tourist pieces, and look back upon a departed glory that manifests itself in moss-covered and decaying totem poles, shapely dugout canoes, and the decorated grave-boxes of their illustrious ancestors.

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THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS

Eighth Annual Meeting, Salt Lake City, Utah, June 17-18, 1942

THE EIGHTH annual meeting of the Association was held at the University of Utah, Salt Lake City, on June 17 and 18, 1942, as a part of the program of the twenty-sixth annual meeting of the Pacific Division, American Association for the Advancement of Science, and associated societies. Four half-day sessions for the presentation of papers were held, besides the annual dinner session, at which the address of the retiring president was delivered and the announcement of the results of the election of officers for the year 1942-1943 was made.

Program, With Abstracts of Papers Presented

(Papers published in full in the foregoing pages are not abstracted here.)

Wednesday Morning Session, June 17:

Influence of Geography on Population Trends in Utah. GEORGE H. HANSEN, Brigham Young University, Provo, Utah.

ABSTRACT: Although the population of Utah has increased from 11,380 in 1850 to 550,310 in 1940, all the towns and cities in the state have not shared in this trend. This growth is shared in the main only by towns and counties that have changed from an agricultural to an industrial base. Most agriculture communities in the state reached their peak in growth before or by 1920, many of them back as far as 1900.

Certain communities because of geographical advantages have grown into thriving trade centers. Of the 29 counties in Utah, 11 made 20% or more gain from 1920 to 1940, 11 made gains from 0 to 17% and 6 counties lost in population over the same period.

Agriculture counties seem to lose in population during so called "good times" and gain during depression years.

Geologic Factors in the Settlement and Development of Utah. HYRUM SCHNEIDER, University of Utah.

ABSTRACT: Three factors were discussed: (1) Mountains (2) Lake Bonneville (3) Ore Deposits. Mountains were barriers that made it difficult for the pioneers to enter Salt Lake Valley and even at the present time mountains make air transportation more hazardous than over the plains.

Mountains made it difficult for the pioneers to enter Salt Lake Valley but without the water supply provided by the mountains Utah could not have been settled. An outstanding example of much heavier precipitation in the mountains than in the adjacent valleys is the difference in precipitation at Salt Lake City at the base of the Wasatch Mountains and at the Silver Lake Station in the mountains less than 25 miles from Salt Lake City. The normal precipitation at Silver Lake is 43 inches a year whereas the normal for Salt Lake City is 16 inches a year. Although this is an extreme case in general precipitation in the valleys is less than 16 inches and in some cases less than 10 inches whereas in the mountains it is generally between 20 and 30.

Sixty per cent of the population of Utah gets its water supply from the Wasatch and Uinta Mountains.

The increased precipitation in the mountains is not simple orographic precipitation but increased convectional summer rain and greatly increased cyclonic precipitation apparently due to the blocking of cyclonic storms.

Deltas and other alluvial deposits formed in Lake Bonneville were important in the initial settlement of Utah because they made it relatively easy for the pioneers to divert water from the streams to irrigate their crops. Without irrigation, agriculture would have failed and without agriculture Utah could not have been settled when it was.

In later years after agriculture had provided a food supply mining became an important industry. Ore deposits have made Utah one of the most important metal mining states in the Union. In 1940 Utah led all the states in the value of the combined production of gold, silver, copper, lead and zinc.

Unfortunately for Utah it was necessary to bring in outside capital to develop her mines. Absentee ownership of many of the mines in the state has not done as much for the development of Utah as resident ownership might have done.

Modification of the Early Utah Farm Village. J. A. GEDDES, Utah State Agricultural College. Published in full in this issue of the *Yearbook*.

The Houses of Southern Utah. J. E. SPENCER, Univ. of Calif. at Los Angeles. Read by W. H. MILLER. To be published in full in *Geographical Review*.

ABSTRACT: The housetypes of southern Utah show interesting characteristics of type and chronologic order of construction. They illustrate the regional transfer of housetypes from one region to another to which they may be ill-suited for geographic reasons. The southern part of the Mormon Commonwealth was settled some years after the northern part of the state, so that several mature adobe brick housetypes had been developed for use in the south. The log cabin was little used in the south. The simplest adobe type was patterned after the log cabin in part. It had two rooms, twin fireplaces at the gable ends, few windows but frequently two front doors. For larger families a two story type was common, and lean-to additions were common in all construction, being added upon demand for additional space. About 1895 a new imported brick type came into use. This was a more complex house, with kiln-fired brick, a new floor plan, decorative features, and other items not seen in previous construction. In the following three decades several wooden housetypes were brought into the valley by missionaries returning after tours in various parts of the country. These were not popular in southern Utah owing to the scarcity of wood and the expense of construction. About 1925 a brick bungalow evolved which was well suited to the environment and frequently used in construction of the period. Renovation of older adobe houses frequently occurred, using new architectural devices to bring the old, plain houses up to the prevailing cultural standard. In the last decade and a half several nation-wide factors have contributed to the breakdown of southern Utah's regional isolation, and many new housetypes have appeared in the valley, usually a bit later than their development elsewhere. The time-lag has steadily been decreasing. Many of these new housetypes are patterns copied from other areas and are not well suited to their new environment.

Settlement Pattern Attitudes of High School Students, Cache County, Utah. W. M. KOLLMORGEN, Bureau of Agricultural Economics.

ABSTRACT: Farmers in Cache County live either in agricultural villages or in open country settlements. Settlements made after the application of the Homestead Law are largely in the open country. Lewiston is a good example of an open settlement; most of its settlers came from agricultural villages in Cache Valley. To discover which type of settlement is preferred by youngsters of high school age, and why, a questionnaire survey was made. The questionnaire was given to 737 pupils in the 10th, 11th, and 12th grades in North Cache and South Cache high schools. Logan High School was excluded. North and South Cache serve areas almost entirely rural

Pupils prefer the type of settlement in which they themselves have lived. Reasons given most frequently for preference of agricultural village settlement relate to social opportunities. Pupils raised in open settlements stress the greater convenience with which farm work can be done in open settlements. Reasons for preference vary little and are not always convincing. Many of the pupils show a groping for reasons to justify particular preferences. Present forms of settlement are taken for granted and most of them were perplexed by the issue made of this. Very few seemed to realize that the agricultural village is a unique form of farm settlement in this country and therefore of interest to students of sociology, geography, and agriculture. Few of the students recognized that the village form of settlement served as protection against Indians. None of them gave other equally important reasons for these cluster settlements.

Wednesday Afternoon Session, June 17:

Symposium, arranged by GEO. H. HANSEN, Brigham Young University, Provo, and WILLIS H. MILLER, California State Planning Board, Sacramento.

ABSTRACT: (by Geo. H. Hansen): The afternoon of June 17 was devoted to a discussion of the "Utah Mormon Village Communities." A qualified panel of experts probed the physical, economic and social body of the typical Utah Mormon village community. Such questions as (1) Do advantages of Village system more than offset disadvantages, and (2) What about the String town, or Farmstead pattern in contrast to the Village pattern.

It was agreed that in the early days, each Mormon village had a vital purpose —all citizens were interested and eager to develope the community as a good place to live and make a living. With the advent of better transportation, many communities found themselves off the main arteries of travel, and hence lost in population while their neighbors more advantageously located became growing trade centers.

The difficulty of keeping the declining village a good place to live now represents a major problem. Such questions as (1) Have the villages declined because their function in the settlement of the Utah frontiers has passed, were discussed pro and con. A decline in local leadership, explained in part by the migration of the young people seems to represent a major consideration. Mr. R. J. Ashton, architect in Salt Lake City, said, "Without vision the people perish, but with it they are scared to death." It was agreed, however, that if the Utah Village people wished to do so, they could keep their communities attractive, modern, and comfortable.

Dr. J. A. Geddes of the Utah State Agricultural College recommended village planning as a means of community expression. He suggested that if a gradual shift to long but narrow farms, each with a short frontage on a main highway, be installed, many of the shortcomings of the present Village might be overcome. He used a proposed plan of Lewiston, Utah, as a sample possibility.

Thursday Morning Session, June 18:

Towns and Cities of the Northwest. H. F. RAUP, Eastern Washington College of Education, Cheney. This paper was published in full as Chapter 26 in the volume, *The Pacific Northwest*, by Freeman and Martin, John Wiley and Sons, New York, 1942.

ABSTRACT: Settlements in the northwestern part of the United States may be divided into four principal groups, with interests directed toward lumbering, agriculture, mining, and transportation. There are relatively few other special-purpose towns and cities. The lumber centers lie at the western and eastern margins of the Columbia Basin. Those to the west, such as Longview, have the advantage of water transportation, but in spite of apparent natural advantages, an element of impermanence threatens most settlements whose principal payrolls must come from easily-depleted raw materials.

Agricultural settlements frequently center around specialty crops such as wheat in the Inland Empire, fruit in the irrigated Yakima valley, or dairying in the Willamette and Puget Sound country. Trade centers in the grazing sections have their own special functions. Mining towns and cities, such as Wallace and Kellogg, Idaho, are often situated in relatively inaccessible locations, and in common with the lumber towns, they have an element of economic insecurity in their existence. Early transportation centers developed in connection with water transport on the Columbia River, but for 50 years or more, the railroad has been of greater importance in this section of the nation, and cities such as Spokane are dependent upon rail activities and services for their principal sources of income. The coastal centers, Tacoma, Portland, Seattle and Vancouver, serve to unite rail and ocean transportation and are important assembly points for raw materials and manufactured goods.

The Pacific Northwest Pea Industry, by OTIS W. FREEMAN, Eastern Washington College of Education, Cheney. This paper will appear in full in a forthcoming issue of *Economic Geography*.

ABSTRACT: The pea industry of the Pacific Northwest is one of the region's leading specialties. Dry peas are grown for seed, stock feed and human consumption. Green peas, mostly of the sweet variety, are canned in great quantities. In addition, fresh peas are sold in season, and increasing amounts are frozen for winter use. The raising of seed peas has been carried on for many years and the bulk of the pea seed for the nation comes from the Pacific Northwest. The Snake River Plains and the Palouse region of eastern Washington are the leading districts. In contrast, except in Utah, the pea canning industry has been important for only a few years. The Blue Mountain district of southwest Washington and northeast Oregon now processes over one-fifth of the canned pea pack of the country in eight large modern plants. Oddly, the Palouse region cans no peas although it raises about one-half of the pea seed for canning.

The explanation comes from the fact that in the Palouse, peas are raised as an alternative crop to wheat and the same machinery is used for both crops. Neither growers nor canners appear interested in starting the canning of peas in the Palouse and Snake River regions. Advantages of the Blue Mountain district include favorable soils and climate, relative freedom from pests, and a long producing season for green peas that results from successive plantings on the slopes of the Blue Mountains from low to high elevations. Half of the peas frozen for winter use in the United States are processed in five refrigeration plants, all in western Washington.

Irrigation and Permanent Agriculture. D. W. THORNE, Utah State Agricultural College, and D. A. ANDERSON, Brigham Young University. Published in full in this issue of the *Yearbook*.

The Use of Maps in Propaganda, by LOUIS O. QUOM, University of Colorado. This article has been published in full in *Journal of Geography* 42:21-32, January, 1943.

ABSTRACT: Maps are traditionally used as guides, and have a reputation for truthfulness. Cartographers are cognizant of the limitations of projection and scale, and attempt in most cases to select a type of projection and a character of symbol that will most truthfully portray the situation in question. Propagandists, however, have exploited these inherent limitations of maps to distort, exaggerate, or deny facts. In this new role, maps become instruments for spreading fear, airing grievances, arousing revenge, or expressing pride. In fact, the map has become a psychological force.

The devices commonly used in propaganda maps include (1) special symbols to denote action; (2) certain types of boundary lines to suggest strength and stability or weakness and disunity; (3) pictorial symbols that exaggerate a situation; (4) color or pattern to create misleading impressions; (5) paired maps to denote contrast; and (6) projections that create false impressions.

Since ideas are more quickly and permanently impressed upon the mind by graphic means, it follows that propaganda maps can best be fought by other maps. Yet, it can be demonstrated by many examples that nations are easily incensed by maps. This fact places a great responsibility on the mapmakers. They must be certain that their maps are in harmony with democratic ideals, that they do not ignore political and geographical reality, and that they create the desired impressions in the reader's mind.

Thursday Afternoon Session, June 18:

Erosion Lessons to Be Learned from Mexico. W. A. ROCKIE, Soil Conservation Service, Portland.

ABSTRACT: Mexico is primarily an agricultural nation throughout all of its several geographic parts. Its principal soil-depleting crops include corn, cane, beans, peppers, tomatoes, bananas, maguey, wheat and the various common kinds of livestock. Certain of these are simply soil-depleting, while others also induce erosion.

In the growing of these erosion-causing crops, sloping lands have been widely used for their production. This slopeland ranges from the gently sloping alluvial and colluvial surfaces of the broad, smooth basins to the steep precipitous slopes in the mountains. The latter are limited in their steepness only by the angle of repose of the soil material when that soil is protected by a heavy mantle of thick vegetation. Cultivated slopes are as steep as 150 per cent.

Land clearing, followed by land abandonment, has been going on for many centuries and is still being actively prosecuted. In certain localities this process of land clearing has removed Nature's mantle of grass, brush and/or trees from vast areas, leaving those lands largely bare of any protective cover. Where this has been done in areas of low rainfall, wind erosion damage is common. Most of their fields show more or less consistent efforts at stripping for protection against the wind, although most of these efforts appear inadequate. Where land clearing has been done in areas of heavy rainfall, the damage is extremely serious. Sheet erosion sweeps soil from every field and gullying appears at an early stage. Usually abandonment of cultivated land occurs only after bedrock dominates the surface of a clearing. In very few fields is there any evidence in any section of Mexico to either retard or prevent sheet washing or gullying.

Since relatively inadequate precautions have been taken against damage to the land itself, the range lands either have been or are now being denuded, the irrigated lands are being ruined by gullying, and the dry-farmed lands are following along a similar course. Only those areas which still support their virgin plant cover appear undamaged.

While the damaged areas include only a minor proportion of the total area of the country, they do include a major proportion of the actual and potential agricultural land. Hundreds of formerly cultivated and grazed slopeland communities have been completely gutted by gullying. Continuing abandonment for much of this class of land appears probable.

Mexico's problems of future land use appear equally serious with those of the worst-eroded sections of the United States.

Disintegrating Earth-Flows of the California Coast Ranges, by JOHN E. KESSELI, University of California. To be published in full in a forthcoming issue of the *Journal of Geology*.

Some Environmental Influences in the Cultural Development of the Haida. WILLIS B. MERRIAM, University of Oregon, Eugene. Published in full in this issue of the *Yearbook*.

Geopolitics—Some Applications and Implications. WILLIS H. MILLER, California State Planning Board, Sacramento.

ABSTRACT: Geopolitics is perhaps the most significant new technique in the world today. It deserves to rank with armies, navies and airforces as an instrument of national power. The military, economic and spiritual might of a country is no greater than the directive skill which guides their use. Geopolitics can provide this essential direction.

The Federal government today is at least dabbling in the fringe of geopolitics, though the word is nowhere mentioned in the name of any agency. There is immediate need for reorganization and coordination in the fields of "information" and policy planning. Geopolitics, even more than most other fields, requires centralization.

We are engaged in a world war; our policy determining agency must have world-wide scope and a world-wide point of view. To accomplish this essential goal it is recommended that a Geopolitical Office incorporating the policy planning functions of a number of existing agencies be established at once, and that all "information" activities of the Federal government be allocated to a single Propaganda (or Information) Office. By so doing, two important phases of our war effort would be consolidated for effective action.

A Commonwealth of Nations: a Geographer's Solution. WARREN D. SMITH, University of Oregon. Read by O. W. FREEMAN.

ABSTRACT: Attention is directed to an article, "World Organization after the War—An Omni-National World Confederation," by the geologist, T. C. Chamberlin,

which was published in the Journal of Geology, Vol. 26, p.p. 701-727, November 1918. At that time, he proposed greater emphasis upon the economic aspects of the League of Nations, the removal of artificial barriers to world trade, and the extension of the freedom of the seas by free "world-ways" across the continents. In addition to Chamberlin's views, any international organization similar to the League should give due consideration to the importance of regionalism, and recognize that the oceans are larger and more important than the continents as natural regions. Regions of the first order should include the Atlantic, Pacific, and Mediterranean regions, and possibly the Indian Ocean. Regions of the second order would include the Baltic countries, the Danubian nations, Northwestern Europe, and other federations which have common bases of culture and economic interest.

Three necessary instruments for carrying out this plan of commonwealth involve the use of a world police force of ships and planes, support of a World Court by the United States, and an international Economic Council composed of experts. Furthermore, international control of raw materials, and of the medium of exchange, and an auxiliary international language, will be required. Full use of the League of Nations organization, personnel and racords would be advisable.

Thursday Evening, June 18:

Annual dinner, Newhouse Hotel, Salt Lake City. Address of the retiring President, FORREST SHREVE: "Vegetation of Northern Mexico." Published in abstract form in this issue of the *Yearbook*.

ALBERT L. SEEMAN

The Association of Pacific Coast Geographers regrets the loss of one of its members, Dr. Albert L. Seeman, Associate Professor of Geography at the University of Washington. Dr. Seeman received a captaincy late in 1942, and was lost on board the airplane crash in Dutch Guiana on January 21, 1943. He graduated from Morningside College in 1921, was granted the M.B.A. degree from Northwestern University in 1924, and the doctorate from the University of Washington in 1930. He was appointed to the staff of the University in 1928.

He had recently published a text entitled *Physical Geography*, and had contributed a number of articles to *Economic Geography;* including "Cranberry Industry of the Pacific Coast," "Communities in the Salt Lake Basin," "Regions and Resources of Alaska," "Seattle as a Port City," "The Development of Reindeer Activities in Alaska," and "Economic Adjustments on the Olympic Peninsula."

N. F. GORDON DAVIS

As this *Yearbook* goes to press, word comes of the sudden death of Dr. N. F. Gordon Davis, of Department of Geology of the University of British Columbia, where he has been in charge of the geography work for that institution. Dr. Davis has been an active and enthusiastic member of the Association for several years, and his influence will be missed. He was a contributor to *The Pacific Northwest*, edited by Freeman and Martin.

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Business Transacted at the 1942 Meeting at Salt Lake City

The following report of the Secretary-Treasurer was read and approved:

RECEIPTS 1941-42:	
On hand 8/1/41	$ 245.30
Received to 6/15/42	230.10
Total Receipts	$ 475.40
EXPENDITURES 1941-42:	
Yearbook Cost	$ 276.54
Other Costs	18.62
Total Expenditures	$ 295.16
NET DEFICIT 1941-42	$ 65.06
PAID MEMBERSHIP 6/15/42	75

Dr. Freeman announced that one-third of the royalties of the book The Pacific Northwest would be turned over to the Association.

Willis B. Merriam, Chairman of the Resolutions Committee, offered the following resolutions which were unanimously approved:

1. The Association of Pacific Coast Geographers extends the thanks of its membership for the courtesy and hospitality shown by the staff of the University of Utah, and particularly thanks Dr. Schneider for his assistance, and Dr. Hansen for arranging the symposium.

2. The Association appreciates the work of the Editorial Committee in charge of the Yearbook, especially that of the Editor, Dr. Leighly. The Association urges this Committee to make every effort to make the 1941-42 issue available to members by the first of January, 1943.

3. The Association suggests that members of the next Nominating Committee consider the advisability of having some continuity in the office of Secretary-Treasurer even though the Constitution calls for the annual election of this officer.

4. The Association requests that copies of these resolutions be sent to the new officers, to the University of Utah, to Dr. Schneider, and to Dr. Hansen.

The Secretary-Treasurer reported the virtually unanimous election of the following officers for 1942-43:

President	Eliot G. Mears
Vice President	John B. Appleton
Secretary-Treasurer	J. Wenger Hoover

Respectfully submitted,
Willis H. Miller
Secretary-Treasurer

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THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS

THE ASSOCIATION of Pacific Coast Geographers was orangized on June 27, 1935. The object of the Association, in the words of its Constitution, is "the promotion of scientific research in Geography and the diffusion of the resulting scientific knowledge." Annual meetings are held in June, usually in conjunction with the Pacific Division of the American Association for the Advancement of Science.

Membership is by invitation; and in practice has generally been limited to those having professional training in geography. Student memberships, open only to undergraduate students in geography, carry all privileges except that of voting. Annual dues are two dollars for regular members and one dollar for student members.

The Association publishes annually the *Yearbook of the Association of Pacific Coast Geographers*. The *Yearbook* contains the proceedings of the Association, abstracts of papers presented at its annual meetings, and a few papers selected from those presented to be published in full. The price of the *Yearbook* to non-members and libraries is one dollar per copy.

Correspondence should be addressed to the Secretary-Treasurer, H. F. Raup, Cheney, Washington.

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